

# Practical Applications of Open Educational Resources (OER)

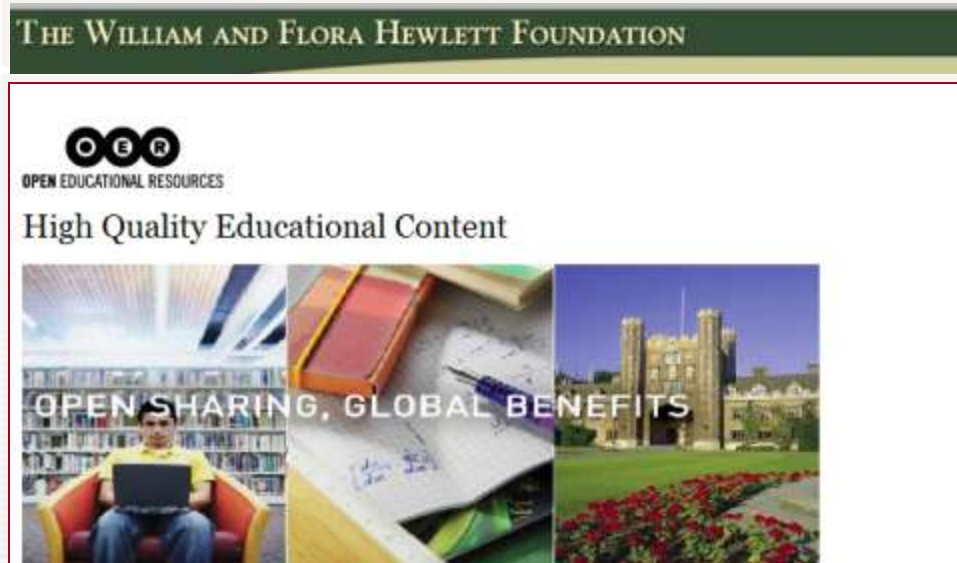


Terri Rowenhorst, NROC

Robert Currie, Montana Digital Academy

Mary Schlegelmilch, Omaha Public Schools

# What are OERs?



Teaching, learning and research resources,

In the public domain or,

Released under a license that permits free use or repurposing by others.

*For examples, see [Creative Commons.org](https://creativecommons.org)*

OERs include full courses, course materials, modules, textbooks,

Streaming videos, audio, text, software, tools, or techniques

Used to support *access to knowledge*.

# Why OER?

- To benefit society by increasing access to quality educational resources at little or no cost to anyone seeking to learn.
- To share and leverage scarce educational resources
- To create more transparency among learning institutions
- To provide different means of access and reuse, depending on the source of the content.



# Living Up to the Promise

So, if OER is **GOOD**, and its **FREE**,



why isn't everyone using it?

# OER Check List

What you are looking for in OER . . .

- ☒ curricular
- ☒ complete
- ☒ quality
- ☒ easy to use
- ☒ teaching tool





# Unique Among OERs



**HippoCampus.org**

- Curricular content for both secondary and post-secondary
- Complete course foundations with a flexible learning object structure
- Sustaining membership to maintain and grow the repository

# NROC Course Library 2010



## College Course Foundations

US History I  
US History II  
American Government  
Religions of the World  
Psychology  
Elementary Algebra  
Introductory Calculus I  
Introductory Calculus II  
General Calculus I  
General Calculus II  
Calculo General I (Spanish)  
Calculo General II (Spanish)  
Statistics for the Social Sciences  
Introductory Physics I (algebra-based)  
Introductory Physics II (algebra-based)  
General Physics I (calculus-based)  
General Physics II (calculus-based)  
Non-Majors Biology  
Environmental Science

## Advanced Placement Course Foundations

AP Environmental Science  
AP Physics B I  
AP Physics B II  
AP Physics C I  
AP Physics C II  
AP US History I  
AP US History II  
AP US Government and Politics  
AP Calculus AB I  
AP Calculus AB II  
AP Calculus BC I  
AP Calculus BC II  
AP Biology

## High School Course Foundations

College Prep Physics I  
College Prep Physics II  
Algebra 1a  
Algebra 1b  
Curso de Algebra 1A (Spanish)  
Curso de Algebra 1B (Spanish)

### Coming Soon!

#### Algebra 1-An Open Course

Developmental Mathematics: Arithmetic  
Elementary Algebra  
Intermediate Algebra  
Geometry & Statistics Topics

### New Content Collections

Chemistry  
Arithmetic  
Geometry  
Advanced Math  
Economics


# Quality

- Media rich
- Editorially rigorous
- Instructionally sound






# Curricular



**HippoCampus**



South Carolina  
Department of Education  
Together, we can.





## South Carolina Dept. of Education

**Announcements** Welcome to the South Carolina Department of Education HippoCampus page...

### Subjects

- ▶ Algebra
- ▼ American Government
  - American Government
  - US Government and Politics for AP\*
- ▶ Biology
- ▶ Calculus
- ▶ Calculus (Spanish)
- ▶ Environmental Science
- ▶ Physics
- ▶ Psychology
- ▶ Religion
- ▶ Statistics
- ▶ US History

### Browse American Government

Course	Textbooks	Standards
<div><b>Government MiniSite</b> <b>New!</b></div> <ul style="list-style-type: none"><li>▶ Topic View</li><li>▼ Course View<ul style="list-style-type: none"><li>Home</li><li>Syllabus</li><li>- Unit 1<ul style="list-style-type: none"><li>Chapter 1</li><li>Chapter 2</li><li>Chapter 3</li></ul></li><li>- Unit 2<ul style="list-style-type: none"><li>Chapter 4</li><li>Chapter 5</li></ul></li><li>- Unit 3<ul style="list-style-type: none"><li>Chapter 6</li><li>Chapter 7</li></ul></li></ul></li></ul>		<h4>The Legislative Branch</h4> <p><b>Readings</b></p>  <ul style="list-style-type: none"><li>Objectives</li><li>Readings</li></ul> <p><b>Lessons</b></p>  <ul style="list-style-type: none"><li>Lesson 16 - S</li><li>Lesson 17 - S</li><li>Lesson 18 - P</li></ul> <p><b>Assignments</b></p>  <ul style="list-style-type: none"><li><a href="#">Key Terms</a></li><li>Writing Assignment</li><li>Discussion Question</li></ul> <p><b>Assessments</b></p>  <ul style="list-style-type: none"><li>Chapter Test</li><li>Answer Key</li></ul>

Correlated  
with popular  
textbooks &  
state  
standards

Complete  
teaching  
materials

# Flexible

Can be used within popular CMS's and repositories

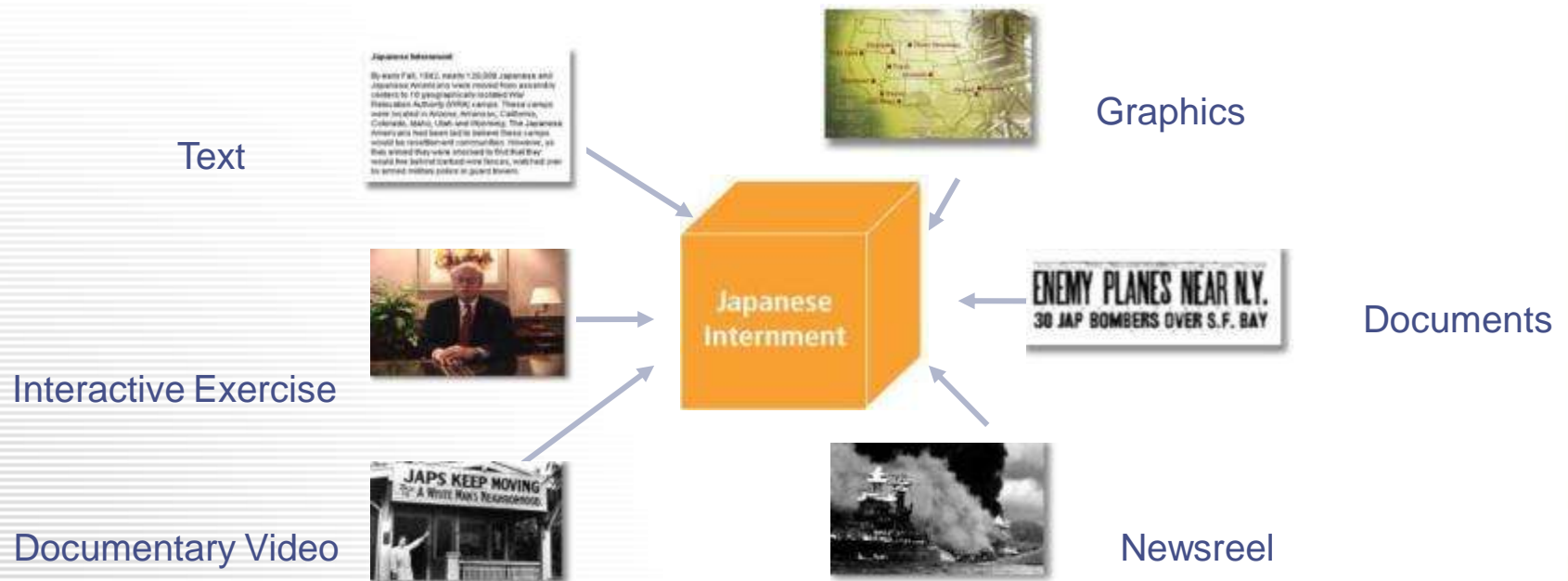
The screenshot shows the HippoCampus website for Albuquerque Public Schools. It features a sidebar with a 'Subjects' list including Algebra, American Government, Biology, AP Biology I, AP Biology II (highlighted), Calculus, Calculus (Spanish), Environmental Science, Physics, Psychology, Religion, and US History. Below this is a 'Bookmarks' section with a search bar for 'AP Biology I' and a link to 'Career as a Biologists?'. The main content area includes an 'Announcements' section with a date '2007-10-17 13:31:22.0' and a text snippet about a sociology assignment. A 'Browse' section at the bottom lists courses and textbooks, such as 'Biology Prentice Hall (Miller, Levine)', 'Biology 7e, Brooks/Cole (Oxman, Berg, Martin)', 'Biology 7e, McGraw-Hill (Raven, Johnson)', and 'Biology 7e, Pearson (Campbell, Reece)'.

This block contains three overlapping screenshots of educational websites. The top-left screenshot shows a page titled 'American National Government (section 01/02)' with a sidebar and a main content area. The top-right screenshot shows a 'Chattanooga State' website with a 'US History I: Timeline (Lessons 1 - 9)' section. The bottom-right screenshot shows a 'COnline' website with a 'Unit 3 - WWI, Depression, and WWII' section featuring a large image of Adolf Hitler.

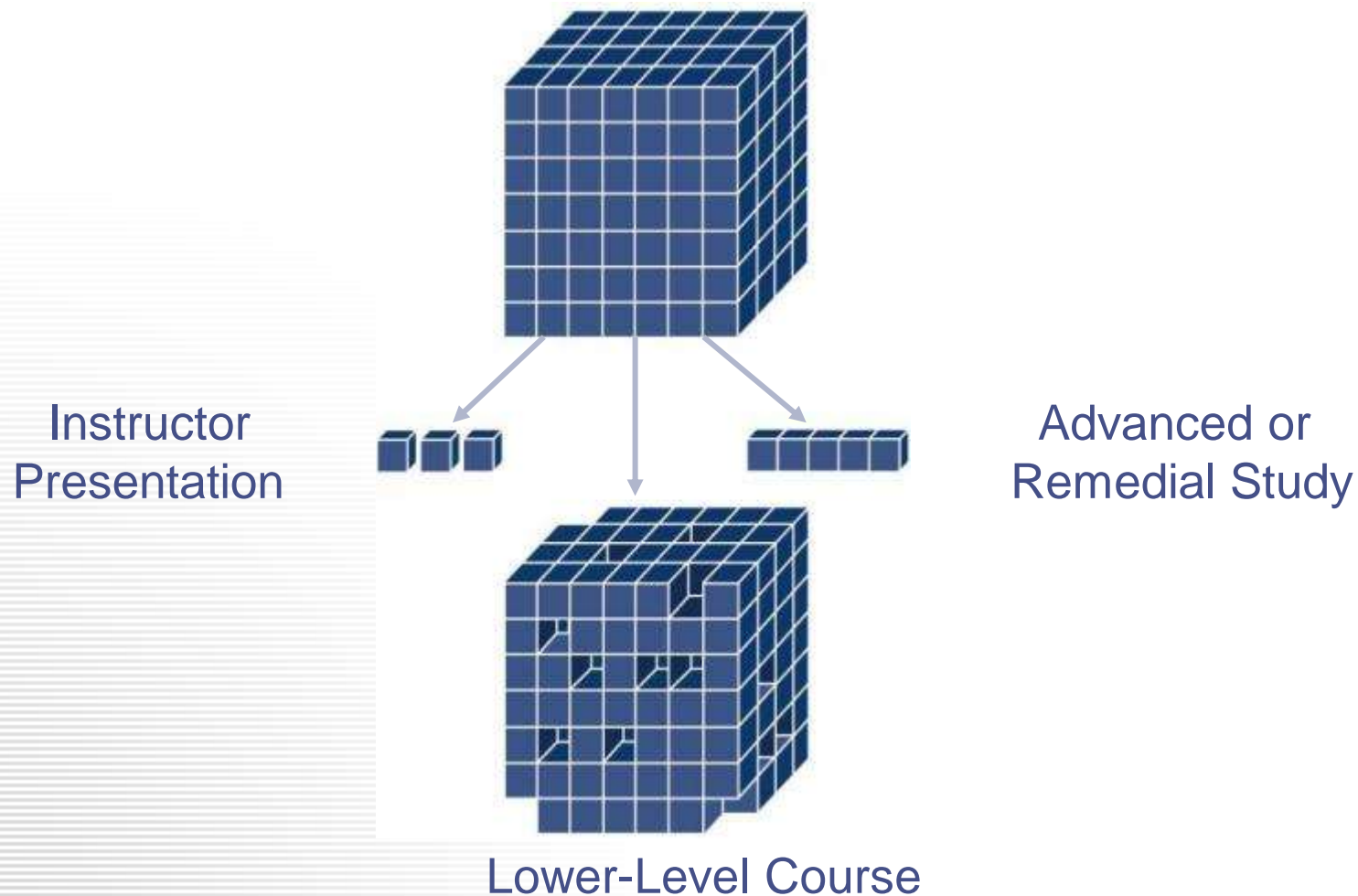
Customizable by a teacher, a department, or a system

# An NROC Learning Object

“An assembly of learning media, including text, graphics, animation, video, audio, simulations, hyperlinks, and assessments, to present a specific concept(s) and achieve defined learning objectives.”



# Reassembling by Purpose







Educators, designers, technologists, and administrators working together to promote the continuous improvement of online courses through collaborative development of high-quality content and instruction.





## Opportunity:

To secure high quality Advanced Placement<sup>®</sup> content and learning objects to enhance *AP* course offerings for Montana students.

*“The quality and flexibility of the NROC content enabled MTDA subject matter experts and course designers to create numerous AP courses very rapidly to meet the demands of our 2010 launch of MTDA.”*

**- Robert Currie, Executive Director, Montana Digital Academy**

# MTDA Courses



MONTANA DIGITAL ACADEMY

English 4 Chinese English 1 AP Biology U.S. Government Spanish  
Earth Science Web Design AP Calculus AB  
Psychology Montana History World History Health  
Latin Microsoft Office Suite AP U.S. History  
AP English Language and Composition Native American Studies  
Oceanography AP U.S. Government and Politics  
AP English Literature and Composition  
U.S. History Current Issues in Government  
German Physical Education  
Environmental Science Algebra 2/Trig Algebra  
AP Physics French Global Studies Physics  
Pre-Calculus English 2 Digital Photography Chemistry Geometry English 3

*...you can learn anywhere in Big Sky Country!*



51 courses available, including a mix of core courses, electives and AP and dual credit

Courses available at 9-12 levels; Middle school courses available next year

2010-2011 courses available *at no cost to Montana students/parents and schools*

# University of Montana Partnership



PHYLLIS J. WASHINGTON COLLEGE OF  
EDUCATION AND HUMAN SCIENCES



*...you can learn anywhere in Big Sky Country!*



## **Courses Are:**

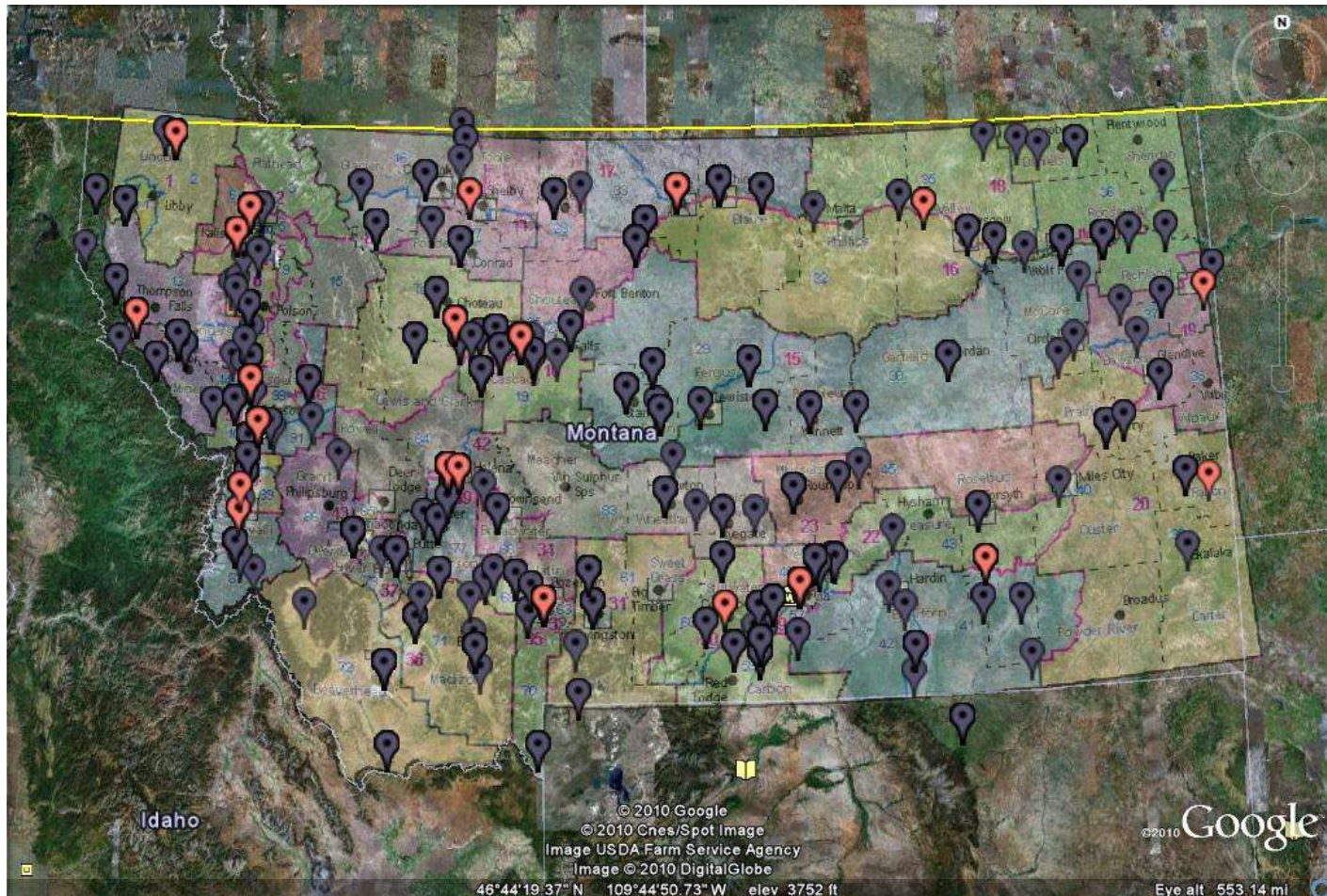
- Built to be exclusively online: courses utilize e-books and online multimedia simulations
- Delivered via Moodle, MTDA's learning management system
- Available 24 hours a day, 7 days a week providing flexible access and availability for students
- Taught by licensed Montana Teachers





# MTDA Teachers and Students

*...you can learn anywhere in Big Sky Country!*



## MTDA Courses Developed Using NROC Content

- AP Biology
- AP Government and Politics
- AP Calculus AB
- AP U.S. History
- U.S. Government
- U.S. History
- Psychology
- Environmental Science
- Physics

# NROC Content Flexibility

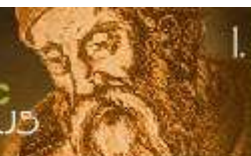


## Advantages of MTDA Courses Developed Using NROC Content:

- Model Course for New SMEs and Teachers
- MTDA Instructors Build on NROC Content
- MTDA “Owns” the Content and Modifications



AP<sup>BC</sup>  
CALCULUS



## I. FUNCTIONS & GRAPHS

### Lesson 7: Trigonometric Functions

ΕΥΚΛΕΙΔΟΥ



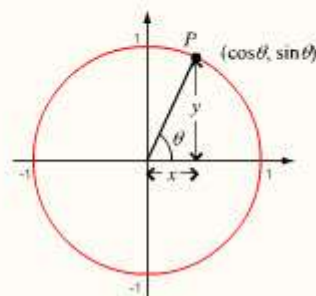
The sine and cosine functions

We can define the basic trigonometric functions using the unit circle. A central angle  $\theta$  determines a point  $P$  on the unit circle. This angle also determines a right triangle whose hypotenuse is the radius of the unit circle, with length 1.

The other sides of this triangle have lengths  $x = \cos\theta$  and  $y = \sin\theta$ . So, point  $P$  has coordinates  $(\cos\theta, \sin\theta)$ .

Using the Pythagorean Theorem, we know that  $x^2 + y^2 = 1$ . Because  $x = \cos\theta$  and  $y = \sin\theta$ , we have  $\cos^2\theta + \sin^2\theta = 1$ .

menu



## US Government & Politics: Lesson 17 - Structure of the Senate Topic 1

“The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof, for six years; and each Senator shall have one vote.”  
— Seventeenth Amendment to the Constitution



In this topic you will learn about:

### Topic 1: Composition of the Senate

- Text - 4 pages
- Explore: Comparing the Senate and the House
- Explore: Hierarchy of the Senate
- Explore: Removal of “The People” from the Legislative Process

Start Topic



- 49,000 students
- urban school
- 7 High Schools
- 2 Alternative Sites
- 11 Middle Schools
- 63 Elementary Schools

## Opportunity:

To customize and adapt rigorous content  
for credit recovery

*“The use of NROC content has opened our thinking to Open Education Resources and their application in the K-12 environment. Adoption of quality, rigorous, multi-modal resources for teachers that align with district standards is vital to student learning.”*

Mary Schlegelmilch  
eLearning Supervisor, OPS

# Credit Recovery through Blended Learning



- Align credit recovery courses with district standards and assessments
- Provide rich multi-modal learning experiences
- Students work individually with assistance from the instructor as needed
- Teachers facilitate the recovery of credits during the school day or afterschool / evenings using the Learning Management System

# Credit Recovery



## Summer School

- Teachers use Master Course and differentiate for student needs

## Transition Room

- Students work during the school day during a study hall period on recovery courses

## Independent Study

- Teachers use Master Course and differentiate for student needs

## Adult High School

- Credit Recovery 1x week classroom experience with 24/7 access to assignments and multimedia lessons

# The Process



- OPS started the transition from an on-line “tutorial” system to a customized on-line system in June, 2006.
- Courses were developed and piloted throughout the 2006/2007 school year.
- The primary on-line delivery model involves a blended environment—which is a teacher in a lab setting facilitating instruction, with some assignments given “anytime/anywhere”.



# Customized Assignments



Course Syllabus Calendar **Course Materials** Resources **MASTER COURSE Algebra 1** Communicate  
Reports Agents Manage

Home || Course > Course Materials > Standard One Algebra... > Lesson 1  
Mary Schlegelmilch - Editor

## Lesson 1: Real numbers & algebraic expressions

[Add Content](#) [Rearrange](#) [Settings](#) [Reports](#) [Utilities](#) [Delete](#) [Print](#) [My Notes](#) | [Previous](#) [Next](#)

- [Objectives](#)
- [Lesson 1 Multimedia](#)
- [Supplemental Readings/Exercises](#)
- [Lesson 1 Quiz](#)

$ax^2+bx+c=0$  **ALGEBRA**

Question 1 of 15

Which of these numbers is equivalent to the rational number 8.37 ?

- ☐ A. 108.37
- ☐ B.  $\frac{837}{100}$
- ☐ C.  $\frac{8.37}{100}$
- ☐ D. 837

Real numbers & algebraic expressions

1. Real Numbers  
Homework
2. Variables, expressions, equations  
Homework
3. Number operations  
Homework
4. Number properties  
Homework
5. More number properties  
Homework

Lesson Practice Test

# Repository Access



## Learning Objects housed in ANGEL Repository

The image shows a screenshot of the Learning Object Repository (LOR) interface. The main header reads "Learning Object Repository Science Repository". Below this, there are tabs for "LOR", "Repository", and "Manage". The breadcrumb trail indicates the current location: "Home || LOR &gt; Repository &gt; NROC Multi Media Les...". The main content area displays a list of folders under the heading "NROC Multi Media Lessons". The folders are: "NROC AP Physics B 1 Multimedia Lessons", "NROC AP Physics B 2 Multimedia Lessons", "NROC General Physics 1 Multimedia Lessons", "NROC General Physics 2 Multimedia Lessons", and "NROC Introductory Physics 1 Multimedia Lessons". A sub-menu is visible for "NROC Introductory Physics 1", showing a list of lessons: "Kinematics - Motion in 1D Lesson 1", "Kinematics - Motion in Two Dimensions Lesson 2", "Newton's Law of Motion - Newton's First Law Lesson 3", "Newton's Laws of Motion - Newton's Second Law Lesson 4", "Newton's Laws of Motion - Newton's Third Law Lesson 5", and "Newton's Law of Motion - Application of Newton's Laws". The interface also includes a navigation bar with links like "Add Content", "Rearrange", "Settings", "Reports", "Utilities", "Delete", "Publish", "Print", "Previous", and "Next".

# Master Courses



## Learning Objects inserted into Master Course

This screenshot shows the "MASTER COURSE Algebra 1" interface. The top navigation bar includes links for Course, Syllabus, Calendar, Course Materials (highlighted), Resources, and Communicate. Below this, there are links for Reports, Agents, and Manage. The breadcrumb trail reads "Home || Course > Course Materials". The user is identified as "Mary Schlegelmilch - Editor". The main section is titled "Course Materials" and includes a toolbar with links for Add Content, Rearrange, Reports, Utilities, Preferences, Print, My Notes, Previous, and Next. A list of course materials is displayed on the left, including "Guide--Algebra 1 Credit", "Standard One Algebra 1", "Standard Three Algebra 1", "Standard Five Algebra 1", "Standard Six Algebra 1", and "Algebra 1 Final Exam". A "toolbar" label points to the "Add Content" link.

This screenshot shows the "MASTER COURSE Algebra 1" interface, specifically the "Standard One Algebra 1" section. The top navigation bar includes links for Course, MASTER COURSE Algebra 1, Course Materials (highlighted), Resources, and Communicate. Below this, there are links for Reports, Agents, and Manage. The breadcrumb trail reads "Home || Course > Course Materials > Standard One Algebra...". The user is identified as "Mary Schlegelmilch - Editor". The main section is titled "Standard One Algebra 1" and includes a toolbar with links for Add Content, Rearrange, Settings, Reports, Utilities, Delete, My Notes, Previous, and Next. A list of learning objects is displayed, including "Lesson 1: Real numbers & algebraic expressions" and "Lesson 2: Simplifying expressions".

## Resource

- to access curriculum resources and lesson plans.

## Credit Rescue

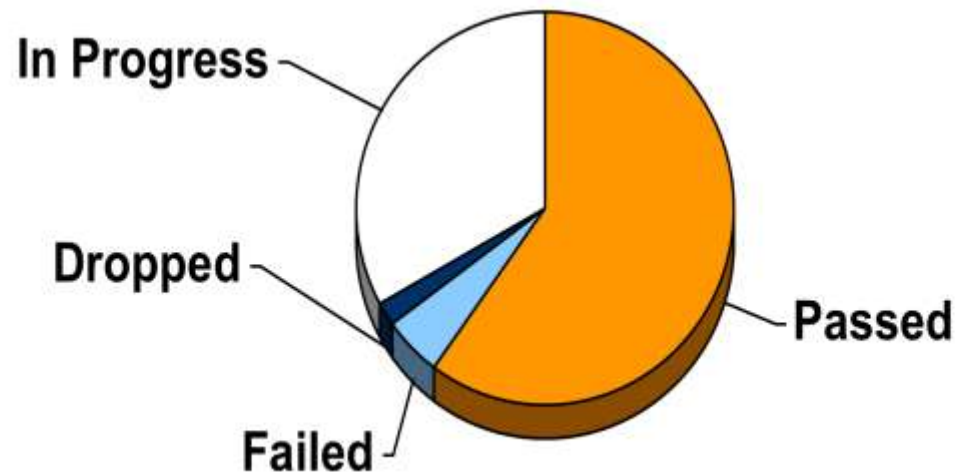
- to reinforce / re-teach concepts missed due to absence or missing skills
- during the term prior to failing the credit



# 2009 Summer School Distribution



The chart above reflects 1,885 course enrollments made by 1,049 individual students

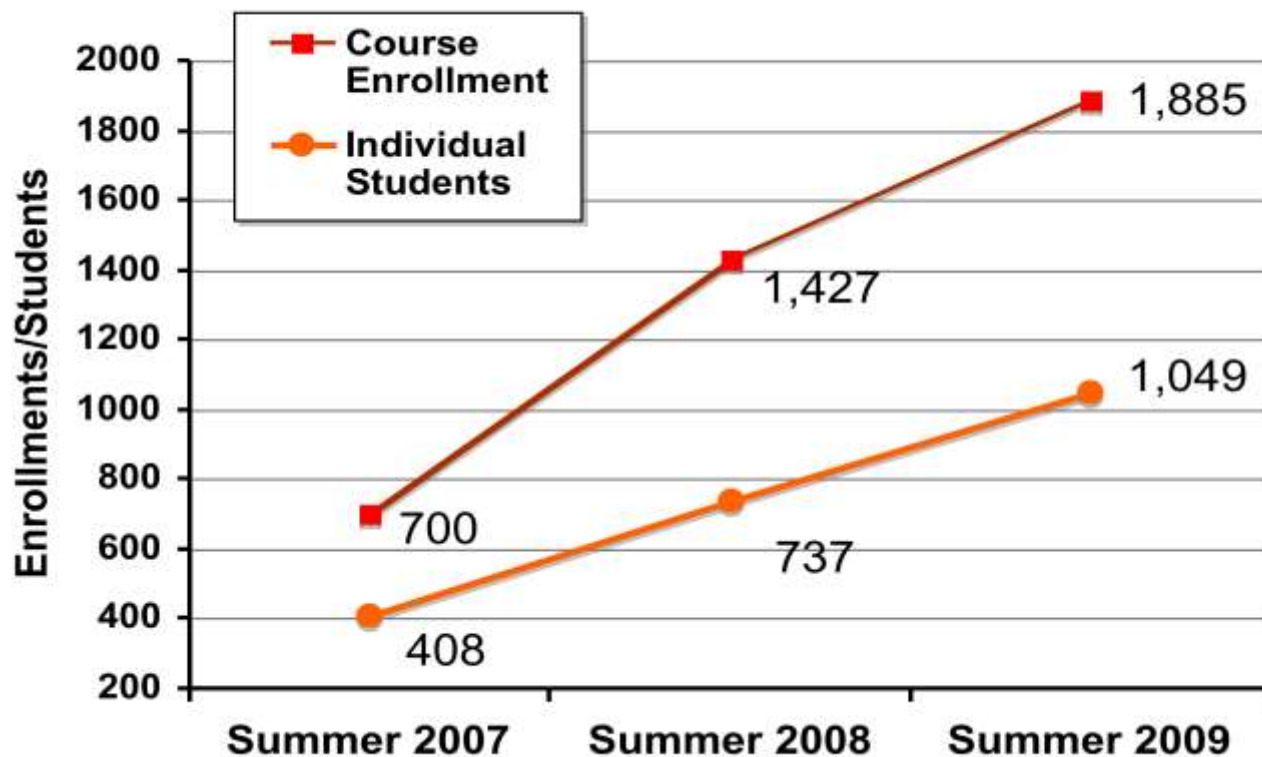


# Growth in e-Course Utilization



	Summer 2007	Summer 2008	Summer 2009
<b>Usage</b>			
Enrollments	675	1,427	1,885
Unique Students	391	737	1,049
<b>Success</b>			
Total Credits Earned	513.5	933.0	1,120.0
Courses Passed	76%	66%	60%
Courses In Progress	14%	28%	33%
Courses Failed	7%	5%	5%
Courses Dropped	3%	1%	2%

# e-Course Enrollment and Student Participation: Summer 2007 to 2009





## Local Strategies

- Consistent message on a District Level
- Differentiate based on Student/Teacher/School Needs
- Accessible 24/7
- Accountable

## Digital Repository for Teachers

- Course Guides
- Pacing Guides
- Best Practice Lessons
- Multi-Media
- Lesson Documents

## State Initiatives

# Expanding Reach



Statewide membership (P20) made available through ***Partnerships for Innovation*** consortium to assist students with the transition from secondary to post-secondary education.

*“Perkins IV launched new thinking about how Nebraska could build statewide systems to accomplish program improvement. Our consortium provides an opportunity to reduce the burden on local institutions by offering resources like NROC for every student and teacher in the state. NROC provides the opportunity for integration of career and academic education in every classroom and learning delivery system.”*

**- Erika Volker, Administrative Director, Nebraska PFI**



# The Value of Participation



- Access to high-quality and diverse content
- Leverage resources of all participants
- Professional development opportunities
- Showcase faculty and institutional expertise
- Provide multi-modal learning experiences and options for students
- *Save time and money*

# 2010 Network Members



Academy School District 20 Online (CO)	Louisiana Virtual School
Alabama ACCESS (DOE)	Lubbock Independent School District Online (TX)
Albuquerque Public Schools (NM)	<b>Maryland State Department of Education</b>
Anaheim Union High School District (CA)	<b>Michigan Virtual High School</b>
Arizona Department of Education	<b>Mid-Hudson Regional BOCES Consortium (NY)</b>
Bambugare Network (Sub-Saharan Africa)	<b>Minnesota Learning Commons (statewide P-20)</b>
Bethel Covenant College (Uganda)	<b>Minneapolis Public Schools Online</b>
California State University at Fullerton	Mississippi Virtual School (DOE)
Catholic School K12 Virtual	Missouri Dept. of Elem. and Secondary Education
Center to Bridge the Digital Divide (WSU)	<b>Montana Virtual Academy</b>
<b>Chattanooga State Tech. &amp; Comm. College (TN)</b>	<b>Montana State University at Billings</b>
Chesterfield School District (VA)	Montgomery Public Schools (VA)
CORE (China)	Myron B. Thompson Academy (HI)
<b>Colorado Community Colleges Online</b>	National Association of Beginning Teachers
Colorado Online Learning	New York City Department of Education
CUDI (Mexico)	Niles Township High School District (IL)
Florida Distance Learning Consortium	<b>Nebraska: Partnerships for Innovation (statewide P-20)</b>
Georgia Virtual School (DOE)	North Carolina Community College System
GLBTQ Online High School (MN)	North Dakota Center for Distance Education
Global Literacy Foundation (AZ)	North Salinas High School (CA)
Greenville County Virtual School (SC)	Northwest Area Education Agency (IA)
Grossmont Union High School (CA)	Odyssey Charter Schools (NV)
Gwinnett County Online Campus (GA)	Oregon Department of Education
<b>Kentucky Statewide Consortium (statewide P-20)</b>	Open High School of Utah (NV)
Hudson Schools of Technology (NJ)	Portland State University
<b>Idaho Digital Learning Academy</b>	Prince Georges School District (MD)
IDEAL-New Mexico	Riverside Unified School District (CA)
Illinois Virtual School (DOE)	Salish Kootenai College (MT)
Indian Prairie School District #204 (IL)	San Luis Obispo County Board of Education (CA)
Innovative Education Design (Korea)	School District of the Chathams (NJ)
<b>Iowa Community Colleges Online Consortium</b>	Sierra Vista High School (CA)
<b>Los Angeles Unified School District</b>	South Carolina Virtual School (DOE)

Tulare County Office of Education (CA)  
 University of Alaska at Fairbanks  
 University of California, Irvine  
 University of Georgia System Board of Regents  
 Utah Electronic High School  
 University of Texas at Brownsville  
 Valley Christian School (CA)  
 Virtual Virginia (DOE)  
 WSU International Research and Development  
 West Virginia University-Parkersburg  
 West Virginia DOE  
 Whitfield County School District (GA)

## *Partner Advisors:*

*Council of Chief State Supervisors and Officers (CCSSO)*

*Southern Regional Education Board (SREB)*



## *Advisors*

# Questions?

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[www.hippocampus.org](http://www.hippocampus.org)

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*"At the heart of the movement toward Open Educational Resources is the simple and powerful idea that the world's knowledge is a public good and that technology in general and the Worldwide Web in particular provide an extraordinary opportunity for everyone to share, use, and re-use knowledge."*

*- The William and Flora Hewlett Foundation*



OPEN EDUCATIONAL RESOURCES